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Abstract

Although research has highlighted the importance of differentiating between different types of social ties – group ties and individual ties – no experimental work exists that investigates the claim that group ties are more beneficial than individual ties, and little is known about how group memberships influence well-being, relative to relationships. We designed a series of experiments that: a) primed either multiple group memberships or multiple interpersonal relationships (vs. films) and observed the effects on participants' induced negative moods (S1, N = 120); b) primed different types (S2, N = 317) and features (S3, N = 183) of groups and observed which led to the greatest increases in life satisfaction; and c) investigated whether feelings of connectedness and self-worth mediated these effects (S1-3). We found that priming relationships satisfied psychological needs and restored and enhanced well-being, but that priming group memberships did so to a greater extent, especially when participants reflected on the group's identity rather than its members. This work contributes to our understanding of why multiple group memberships are beneficial, and highlights how important social identities associated with groups can be for well-being.

Key words. *Social identity; mood; life satisfaction; psychological need satisfaction; multiple group membership*

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Those with more social connections experience better well-being (Holt-Lunstad & Smith, 2010; Holt-Lunstad et al., 2012; Holt-Lunstad et al., 2017). Until recently, it has been presumed that these benefits generalize across relationship type (see House, 2001; Holt-Lunstad, 2018), but this has recently been contested by research showing that (more) social group ties (e.g., community groups) are better predictors of well-being than (more) interpersonal ties with a significant other (e.g., a child or a spouse; C. Haslam, Cruwys, & Haslam, 2014; C. Haslam et al., 2016). However, no experimental work exists to support the claim that group ties are more beneficial than individual ties, or to support the mechanisms that that are thought to underpin this association, which leaves questions regarding causality unanswered. Furthermore, little is known about *how* group memberships influence well-being, relative to relationships, beyond offering members greater levels of social support (C. Haslam et al., 2016). Building on previous research informed by a social identity approach to health (e.g., Jetten et al., 2012; Jetten et al., 2017; C. Haslam et al., 2018), we argue that group ties have especially beneficial consequences for health because they provide group members with meaningful *social identities* (Tajfel& Turner, 1979), which build a sense of connection among group members and provide them with feelings of self-worth.

In this paper, we present three experiments that: a) prime either multiple group memberships or multiple interpersonal relationships (vs. films) and observe the effects on participants' induced negative moods (S1); b) prime different types (S2) and features of groups (S3) and observe which leads to the greatest increases in well-being; and c) investigate whether psychological need satisfaction mediates these effects (S1-3). In doing so, we sought to compare – for the first time – the beneficial effects of priming multiple group memberships versus priming multiple interpersonal relationships, and to examine potential underlying mechanisms.

Social ties and well-being

Durkheim (1897) observed that social relationships protect us from psychological harm. Subsequent research traditions defined social relationships as a critical component of our well-being because they fulfill a number of both emotional and material essential needs (S. Cohen & Wills, 1985; House, Landis, & Umberson, 1988; Kessler & McLeod, 1984; Lin, Dean, & Ensel, 1986; Thoits, 1995). Since House and colleagues' seminal review (1988) of the impact of social relationships on health, the body of evidence has grown exponentially and now comprises hundreds of studies, using a diversity of measurement approaches. Holt-Lunstad, for example, has examined the influence of both the quantity and quality of social relationships on long-term health and on risk for mortality in three meta-analyses (Holt-Lunstad et al., 2010; Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015). Despite the variability in measures used, all social connection indicators (e.g., not living alone, being married, participating in social groups, having more friends, and unstrained relationships) made a significant contribution to longevity, similar to other protective factors (e.g., physical activity). Indeed, there is considerable evidence supporting psychological (e.g., Cacioppo & Cacioppo, 2014), biological (e.g., Yang et al., 2016), and behavioral (e.g., DiMatteo, 2004a, 2004b), pathways by which social connections influence important health outcomes.

A newer body of social-psychological research proposes an integrated explanation of why and how social factors relate to health by focusing on the distinctive benefits of *group* memberships (Jetten et al., 2012; Jetten et al., 2017; C. Haslam et al., 2018). These researchers draw on the recently developed Social Identity Approach to Health to propose that the critical factor that underpins the positive effects of social ties is an individual's social identification with fellow group members (Jetten et al., 2012; Jetten et al., 2017; C. Haslam et al., 2018). This, they argue, provides the basis for productive engagement with others, which

promotes health and well-being. Indeed, group memberships and the social identities associated with them have been shown to be associated with better adjustment, coping, and well-being (Cruwys et al., 2015; Gleibs et al., 2011; Haslam et al., 2005; Haslam et al., 2009). Furthermore, evidence has confirmed that the 'the more (groups) the merrier': belonging to *more* groups rather than fewer has a range of positive benefits (Jetten et al., 2015). Experiments have also shown that priming multiple group memberships increases resilience (Jones & Jetten, 2011), satisfies psychological needs and decreases depression (Greenaway et al., 2016), and leads to less negative mood (Cruwys et al., 2015).

This work reinforces two key points within the social identity approach to health: namely, that it is the *social identity* that stems from groups that is responsible for their health-related benefits (Jetten et al., 2017); and that social identities are an important psychological *resource* (Jetten, Haslam, Haslam, Dingle, & Jones, 2014; Greenaway, Cruwys, Haslam, & Jetten, 2016).

Groups vs. Relationships

Correlational studies that have compared the effects of group ties against individual ties have found that group ties are associated with more beneficial outcomes. For example, Helliwell and Barrington-Levy (2012), using large-sample global and Canadian survey data, found that group identity variables (people's sense of belonging to their communities, province, and country) added significantly to the explanation of life satisfaction, and to a greater extent than did the interpersonal relationships variables. Jetten and colleagues (2015) found that measures relating to people's interpersonal relationships were weaker correlates of self-esteem than group identity variables. Haslam and colleagues (2016) found that group ties are stronger correlates of cognitive health than individual ties, and showed that this was probably due to their capacity to enhance a sense of shared social identification. Finally, drawing on

three waves of the English Longitudinal Study of Ageing, Haslam and colleagues (2014) showed that only group ties had a significant and sustained impact on cognitive health.

Such studies suggest that group ties are especially beneficial because they cultivate social identification (also see Sani et al., 2012). However, none of the work comparing group ties to interpersonal ties has directly investigated causality through experimental designs, and so the independent causal effects of relationships and groups remain ambiguous. Furthermore, few of the studies investigate the mechanisms that link group memberships – relative to relationships – to well-being (but see C. Haslam et al., 2016). We address these gaps in the literature by testing experimentally, for the first time, whether the beneficial effects of multiple group memberships are distinguishable from, and stronger than, those associated with multiple interpersonal relationships, and by investigating the mechanisms through which groups enhance well-being relative to relationships – specifically investigating *social identity processes.* To do this, we use priming procedures in which participants are asked to reflect on important group memberships or other social relationships. We then assess their mood or well-being.

We anticipate that there will be some overlap between priming multiple group memberships and multiple interpersonal relationships. People belong to many different social groups—ranging from family, small friendship groups, flatmates, or work colleagues—to larger categories such as British, female, student, Muslim, or psychologist. The former groups usually involve face-to-face interactions and meaningful (i.e. important) interpersonal relationships; the latter often may not (C. Haslam et al., 2018) and instead are based on the meaningful (i.e. important) shared identities these categories provide (Deaux & Martin, 2000; Easterbrook & Vignoles, 2012, 2013; Postmes, 1994; Prentice, Miller & Lightdale, 1994). For small groups, then, especially families or hobby groups, a separation between 'groups'

and ‘relationships’ is rather artificial. Nevertheless, groups may still offer something distinctive *over and above* multiple interpersonal relationships. As noted in the preceding section, the *curative* properties of groups seem to be driven by the shared *social identity* that results from individuals categorizing themselves as group members.

As an individual identifies with a group and thus categorization of the self shifts away from the personal toward the collective level, “depersonalization” occurs (Brewer & Gardner, 1996; Markus & Kitayama, 1991; Oakes et al., 1994), where the individual comes to see him- or herself in terms of group characteristics (Hogg & Turner, 1987; Simon, Pantaleo, & Mummendey, 1995), pursues group-level goals (Kramer & Brewer, 1984), experiences group-level emotions (Moons, Leonard, Mackie, & Smith, 2009), behaves in a manner that is consistent with group stereotypes (Spencer, Steele, & Quinn, 1999), and regulates the self, based on his or her social identity (Sassenberg & Woltin, 2008). As a result, when people are operating at a group-level of identity, all the members of the group become perceived as interchangeable exemplars of the group. This means that, unlike interpersonal relationships, the collective or group identity is not bounded or tied to any individuals or events, and is therefore more abstracted and inclusive than representations of interpersonal relationships.

Construal level theory (CLT; Liberman & Trope, 2008; Trope & Liberman, 2010) suggests that events and objects can be represented at either a higher, more abstract level involving consideration of superordinate goals and broad categorizations, or at a lower, more concrete level involving consideration of subordinate goals and narrow categorizations. In line with our above argument, a more abstract (as compared to concrete) construal level is associated with a focus on similarity, more inclusive categorization, and a broader conceptual scope (Förster, 2009). Thus, the social identities that groups provide their members with, and the depersonalization processes that result, are likely to represent higher-order construals than

those that result from interpersonal relationships. A focus on the self and higher-order construal are thus integral to the concept of social identification, and may be the mechanism that underlies the curative properties of groups compared to interpersonal relationships. Indeed, research has shown that higher compared to lower-order construals are associated with higher life satisfaction (Updegraff & Suh, 2007), greater emotional benefits (Aknin, Boven & Johnson-Graham, 2014), and enhanced self-control (Fujita et al., 2006).

With this in mind, we aimed to investigate (a) whether groups can restore (study 1) and enhance (studies 2 and 3) well-being, (b) whether groups can restore (study 1) and enhance (studies 2 and 3) well-being more than can relationships, and (c) whether this is due, in part, to the social identities that groups provide their members with.

Mediating processes underlying the beneficial effects of groups

Research on processes underlying the positive outcomes associated with group memberships has suggested that social identities enhance well-being because they provide their members with the important psychological resources that are required for well-being (C. Haslam et al., 2018). However, there has never been a direct comparison of the processes that might link group memberships *and* interpersonal relationships to well-being. We address that gap here.

We draw on several theories to make predictions about key mechanisms that could underlie the benefits of group memberships. In particular, Social Identity Theory (Tajfel & Turner, 1979) suggests that people derive a sense of self-esteem from their positive social identities. Self Determination Theory (Deci & Ryan, 2002) posits relatedness and competency as psychological needs necessary for well-being, and we argue that groups are especially well suited to satisfy these needs. Social cure theorizing (C. Haslam et al., 2018) clearly articulates that social identities enhance social support, which in turn enhances wellbeing. We

therefore contend that multiple group memberships and the resulting social identities benefit well-being because they offer social support and provide feelings of relatedness, self-esteem and competence.

Social cure theorizing contends that when people are operating in terms of a shared group membership, they will expect to give each other support, actually give each other support, and construe the support they receive more positively because they recognize fellow in-group members as 'one of us' (C. Haslam et al., 2018). Indeed, previous research has established social support as one of the core mediators of favorable group membership outcomes (e.g., Alnabusi & Drury, 2014; Haslam et al., 2005). A shared social identity among people acts as a basis for both giving and receiving social support (Drury et al., 2015, Haslam et al., 2005) which, in turn, benefits well-being (e.g., Johnstone et al., 2015). Relationships have also been shown to enhance perceptions of social support (Pennington, Gillen & Hill, 1999) which, in turn, reduce anxiety (Boyes, 2015). Critically, however, research has demonstrated that group identification also increases the *perception* that fellow group members will be supportive (Alnabusi & Drury, 2014). As Haslam and colleagues explain (2018), this may be because all group members become interchangeable exemplars within one's self-concept, and so each is a potential source of support. We contend that through this depersonalization and categorization process, groups might provide greater perceptions of social support than relationships.

Beyond social support, groups also provide feelings of belonging or relatedness. According to Self Determination Theory (Deci & Ryan, 2002), relatedness is a fundamental human need that must be satisfied to maintain well-being (e.g., Reis et al., 2000; Sheldon & Bettencourt, 2002; Sheldon & Elliot, 1999), and we propose that groups promote well-being because they are especially well suited to satisfy this need. Relationships provide feelings of intimacy and

relatedness, which may account for some of the beneficial effects of relationships on well-being (Baumeister & Leary, 1995; Deci & Ryan, 2000; Hadden, Smith & Lee, 2013; La Guardia & Patrick, 2008). Groups too can provide feelings of belonging, in part because of the interactions among group members, but *also* through the self-categorization perceptions of similarity and self-stereotyping typically associated with large and abstract social categories with clear collective identities (Easterbrook & Vignoles, 2013; Hogg & Hains, 1996; 1998). Furthermore, social support provided by group members may induce feelings of connectedness. We contend that these are additional sources of belonging that apply only to groups. We thus argue that, apart from the concrete support that groups often provide, social identities create a subjective sense of connectedness that relies on the *perception* of connectedness amongst interchangeable group members. Group members will thus be more likely to perceive themselves as similar, connected, and positively oriented towards each other.

This work demonstrates that relatedness and social support may mediate the beneficial effects of both relationships and groups, but that groups have an additional element – the depersonalization and categorization processes associated with the social identities group provide – that is likely to satisfy them more; and these two needs are conceptually similar in that they both relate to the sense of connection and solidarity with others (Ryan & Deci, 2000; Becker et al., 2014). We will therefore investigate whether these needs can be collapsed into a composite need, and then test whether this connectedness need mediates the positive outcomes associated with group memberships. This will help to minimize the 'multiple testing problem' risk inherent in measuring too many variables in any given study (Ranganathan, Pramesh, & Buyse, 2016).

In addition, both groups and relationships can enhance a sense of self-esteem, competence and effectiveness (Vignoles et al., 2006). Regarding relationships, competence fulfilment plays a key role in relationship satisfaction primarily because people can only be truly responsive to a partner's needs if they feel competent and adequate in the relationship (Patrick et al., 2007). Romantic relationships, especially, provide people with increased self-esteem (Luciano & Orth, 2017) because people internalize their partner's positive judgments of them (Boyes, 2015). Romantic relationships may also enable people to achieve things they could not as individuals (Gabb et al., 2013).

In regard to groups, self-esteem has been established as a core mediator of the positive outcomes associated with groups (e.g., Greenaway et al., 2015, 2016), and previous research has shown that social identities act as sources of self-esteem (e.g., Jetten et al., 2015), and that the fulfilment of this need benefits well-being (e.g., Bettencourt et al., 1999). Social Identity Theory provides a theoretical explanation for this, that may explain why groups might boost individuals' self-esteem more than relationships can. It proposes that people strive to emphasizing the *positive distinctiveness* of their social identities – that is, the relatively higher status of any group that we belong to in comparison to relevant outgroups (Tajfel & Turner, 1979) – and that this provides feelings of self-esteem.

Groups can also impart feelings of competence to group members as they enact their social roles and receive encouraging feedback from their supportive group members (Deaux & Martin, 2003; Stets & Burke, 2000), and because groups can achieve things as collectives that individuals or dyads cannot (e.g. collective action; Bettencourt & Sheldon, 2001; Greenaway et al., 2016). Indeed, according to Self Determination Theory (Deci & Ryan, 2002), competence is also a fundamental human need that must be satisfied to maintain well-being

(e.g., Reis et al., 2000; Sheldon & Bettencourt, 2002; Sheldon & Elliot, 1999), and that groups promote well-being because they can satisfy this need.

Thus, self-esteem and competence may mediate the benefits of both relationships and groups; and these two needs are similar in that they both relate to a sense of effectiveness and personal value (Becker et al., 2014; Ryan & Deci, 2000). We will therefore investigate whether these needs can be collapsed into a composite need, and then test whether this self-worth need mediates the positive outcomes associated with group memberships, which will also help to minimize the 'multiple testing problem' risk (Ranganathan, Pramesh, & Buyse, 2016).

There are arguably a number of other needs that could be investigated. However, our research priority was not to come up with an exhaustive list of psychological needs that identities provide, but, rather, to demonstrate the operation and efficacy of identity processes by testing a set of needs that are supported by existing theory, that are also satisfied by our interpersonal relationships, and to show that group identities can 'add value'.

The present studies: three experiments

We set out to provide the first experimental evidence for the beneficial effects of group memberships, in comparison to interpersonal relationships, with a view to investigating the mechanisms through which group ties, relative to individual ties, enhance well-being. In light of the evidence that exists showing that social identities provide a number of psychological resources, we tested the possibility that group memberships, relative to relationships, offer members greater levels of social support, *as well as* increased feelings of relatedness, self-esteem and competence. Critically, we test the possibility that the additional benefit to well-being associated with groups is driven by the social identities they provide.

Study 1

Feeling unhappy – that is, being in a negative affective state – is one of the many forms encompassed by the broad construct of well-being (Diener, 1984). In the first study we adopt this conceptualization, and operationalize well-being as the presence of positive mood and the absence of negative mood (Diener & Emmons, 1984). Cruwys and colleagues (2015, Study 2) found that people reported less negative mood after thinking of their important group memberships, compared to a control condition. We build on this by investigating whether *psychological* resilience – that is, *recovery* from a negative mood state – can be increased by thinking of important group affiliations. Importantly, we did not constrain participants as to the kinds of groups they might think about because we did not want to rule out *a priori* small groups since these are so manifestly important to many people (Lickel et al., 2000).

We tested the following hypotheses:

(H1) Thinking and writing about important group memberships or important interpersonal relationships will have positive effects on mood, in comparison to a control condition (thinking and writing about films); but thinking and writing about important group memberships will be more beneficial than thinking and writing about important interpersonal relationships.

(H2) The satisfaction of psychological needs of connectedness and self-worth will mediate the restorative effect of group memberships on mood.

In Study 1 we set out to test these hypotheses using a novel experimental procedure. We also conduct a thematic analysis on participants' reflections of their important group memberships and relationships. We report all measures, manipulations, and exclusions in this study.[1] All studies were approved by the relevant institutional ethics committee.

Method[2]

Participants and design. We first conducted a pilot study with 60 university students (36 female; Age: *M*=22.72, *SD*=2.99, Range = 19-33 years) to determine a suitably powered sample size for study 1. Power analysis (using G*Power) indicated that 120 participants across three conditions would be required to detect an effect similar to that found in the pilot study (using the pilot study effect size of the critical and significant 'groups vs. relationships' comparison observed there), with 80% power and $\alpha = .05$. The sample therefore consisted of 120 people (80 female; Age: *M*=23.48, *SD*=5.65, Range = 18-60 years), with 40 participants in each condition. Participants were either university students or people that used a public library. No participants were excluded from the study. Compensation was not offered to participants. We employed a 2 (time: mood pre-manipulation vs. mood post-manipulation) x 3 (experimental condition: groups vs. relationships vs. films) mixed design, with experimental Condition as a between-subjects factor and Time as a within-subjects factor. Well-being was operationalized as positive affect.[3]

Procedure, materials and measures. Participants were tested individually. First, they underwent a negative mood induction procedure. This comprised a combination of two well-established mood induction methods, Prokofiev's *Russia under the Mongolian Yoke* played at half speed (Clark et al. 2001), and writing about an unhappy life event (Fishbach & Labroo, 2007). We did extensive pre-testing that confirmed the effectiveness of our experimental manipulation.[4]

Immediately after the mood induction, participants reported their mood with a version of the Positive and Negative Affect Schedule (PANAS; adapted from Watson et al., 1988). Participants were asked to indicate the extent to which they were experiencing six positive emotions (e.g. happy; α = .75) and six negative emotions (e.g. down; α = .92) using a 5-point scale ranging from 1 *Not at all* to 5 *Extremely*. Because our analyses revealed comparable effects for both subscales, we simplified our analyses by reverse coding the negative emotion scales and using the mean PANAS score of all items as our measure of positive affect pre-manipulation (α = .90).

Next, participants completed the experimental manipulation. They were randomly assigned to write about *either* three important social groups ('Family' (31%) was the most frequent response in the Groups condition, followed by 'Nationality' (16%) (*n*=40)), *or* three important interpersonal relationships ('Relative' was the most frequent response (36%) in the Relationships condition, followed by 'Friend' (26%) (*n*=40)), *or* three films/ TV programs of their choice (*n*=40). We selected three groups, as this had proved to be a sufficient number to demonstrate an effect in previous research (Cruwys et al., 2015, Study 2), and because using three groups avoids any idiosyncratic effects due to any one particular group. We chose films as the control condition because we wanted the control task to be as engaging as the other conditions but without any explicit reference to relationships or groups. Those in the Groups condition were given ten examples of social groups (e.g., age, gender, nationality, sports club, my family) and were told that 'these are a number of groups that are important to people. Some are social category memberships, and some involve face-to-face interactions with people.' Those in the Relationships condition were given ten examples of relationships (e.g., romantic partner, relative, friend, teacher, flat mate) and were told that 'these are a number of people that may be important to you. All involve close individual relationships with people'.

After choosing three groups or relationships, those in the Groups and Relationships conditions indicated how much they agreed with the statements *'This group/relationship is important to me', and 'I identify with this group/ relationship',* on a scale from 1 *Strongly disagree* to 7 *Strongly agree,* before they read the following instructions: *'Now take a moment to think about your groups/relationships. In a few words, please describe why your group/relationship is important or unimportant to you.'* Participants in the control condition rated how much they liked the films they had listed on a scale from 1 *Not at all* to 7 *Very much*, before describing each film in a brief sentence. Participant booklets looked identical so the experimenter was blind to the condition that each participant had been assigned to.

Next, participants reported their mood again by completing a second (adapted) 12-item PANAS, which served as our measure of positive affect post-manipulation (α = .93; PA items post-manipulation α = .81, NA items post-manipulation α = .94). This contained different items from the pre-test measure to avoid repetition and boredom, to obscure the purpose of the manipulation and hence discourage socially desirable responding. Our measure of positive affect at Time 1 consists of the first 10 items of the 20-item PANAS scale, plus two items that we contended capture positive and negative affect respectively (down, happy); whereas our measure of positive affect at Time 2 consists of the second 10 items of the PANAS scale, plus two items that are synonymous to those added to the Time 1 scale (sad, cheerful). We added the two additional mood items to each of the mood scales to have two obviously face-valid items, in addition to the PANAS ones.

Prior to completing demographic information, participants completed a series of measures that were included as potential mediators, presented to participants in random orders.[5] All measures used a 5-item scale ranging from 1 *Strongly Disagree* to 5 *Strongly Agree.* These included four items measuring social support *(e.g. 'I can get the emotional support I need from other people'*; α = .94; Haslam et al., 2012); three items measuring self-

esteem *(e.g. 'On the whole, I am satisfied with myself';* α = .94; Jetten et al., 2015); three items measuring competence (e.g. *'I feel that I can successfully complete difficult tasks and projects'*; α = .94; Deci & Ryan, 2000), and three items measuring relatedness *(e.g. 'I feel a sense of contact with people who care for me and whom I care for'*; α = .95; Deci & Ryan, 2000). Participants were finally thanked and debriefed.

Results[6]

Manipulation checks. Our manipulations were successful. Replicating the pilot study, a one sample t-test established that we were successful in depressing participants' mood prior to our experimental manipulation: mean positive affect pre-manipulation (M = 2.26, SD = .69) was significantly lower than the mid-point of 3 on the 5-point mood scale, 95% CI [-.86, -.61], t (119) = -11.69, $p < .001$. We were also successful in priming participants to focus on their *important* groups or relationships, defined by whether importance of, and identification with, the group or relationship was above the mid-point (4) on the 7-point importance, and identification, scales. Mean importance for groups and relationships (M = 6.41, SD = .73) was significantly higher than the mid-point of 4, 95% CI [2.25, 2.57], t (79) = 29.73, $p < .001$; and mean identification for groups and relationships (M = 6.33, SD = .69) was significantly higher than the mid-point 4, 95% CI [2.17, 2.48], t (79) = 30.02, $p < .001$. Furthermore, we are confident that participants were thinking of groups in the group condition, relationships in the relationship condition, and films in the film condition, as 100% of participants in the groups condition actually wrote about groups, 98% of participants in the relationships condition actually wrote about relationships, and 100% of participants in the films condition actually wrote about films.

Groups prime effect (H1). Hierarchical multiple regression was used to examine the effects of condition on post-mood, controlling for pre-mood, using two orthogonal contrasts:

'Social vs. Control' (contrast-coded: groups (1), relationships (1), films (-2)); 'Groups vs. Relationships' (contrast-coded: groups (1), relationships (-1), films (0)) (see Table 1). The addition of 'Social vs. Control' and 'Groups vs. Relationships' (Model 2) to Model 1 significantly improved the model fit, $\Delta R^2 = .51$, $F(2, 116) = 62.85$, $p < .001$, and both contrasts significantly predicted post-mood ('Social vs. Control': $\beta = .68$, $p < .001$, CIs [.33, .48], Cohen's $d = 2.16$; 'Groups vs. Relationships': $\beta = .24$, $p < .001$, CIs [.11, .37], Cohen's $d = .86$). Thus, replicating the large effect size in the pilot study, participants in the Groups (pre-manipulation $M = 2.33$, $SD = .71$; post-manipulation: $M = 4.31$, $SD = .62$) and Relationships (pre-manipulation $M = 2.28$, $SD = .62$; post-manipulation: $M = 3.87$, $SD = .38$) conditions reported significantly more post-manipulation enhanced overall mood compared to Control (pre-manipulation $M = 2.18$, $SD = .74$; post-manipulation: $M = 2.82$, $SD = .66$), and thinking about Groups also enhanced mood significantly more than thinking about Relationships.

< Table 1 here >

Mediators of the effect of the Groups prime (H2). Several of the proposed mediators are conceptually similar, particularly relatedness and social support, which both relate to the sense of connection and solidarity with others, and competence and self-esteem, which both relate to a sense of effectiveness and personal value (Ryan & Deci, 2000). Indeed, they were all highly correlated with one another ($r > .60$; see Table 2). To determine whether it would be more parsimonious to collapse some of the needs into composites, we conducted an exploratory factor analysis using principal axis factoring and direct oblimin rotation of two factors (based on an initial scree plot and eigenvalues > 1). Factor 1 contained the items measuring social support and relatedness, and accounted for 71% of variance, with all factor loadings above .69 and no cross loadings above .30; Factor 2 was formed of the items

measuring self-esteem and competence, and accounted for 11% of variance, with all factor loadings above .84 and no cross loadings above .30.

We thus merged the self-esteem and competence items into a Self-Worth factor (α = .96), and the relatedness and support items into a Connectedness factor (α = .96).[7]

< Table 2 here >

We used Hayes' PROCESS (2012) model 4 to specify a multiple mediation model (95%CIs; 5000 bootstrap samples) with the two needs mediating the effects of the 'Groups vs. Relationships' contrast on post-mood, with the 'Social vs. Control' contrast and pre-mood as covariates (see Figure 1). This model (R^2 = .77, F(5, 114) = 77.80, p < .001) showed that connectedness and self-worth were underlying the effects of the critical 'Groups vs. Relationships' comparison. Once these needs were included in the model, 'Groups vs. Relationships' *only indirectly* predicted positive affect via connectedness (indirect = .09, CIs [.02, .20]) and via self-worth (indirect =.22, CIs [.10, .38]). The direct effect of 'Groups vs. Relationships' on positive affect was not significant (direct = .01, CIs [-.10, .12]). Thus, after a negative mood induction, participants who thought about groups had an enhanced mood compared to those who thought about relationships, and this was due to increased feelings of connectedness and self-worth.

< Figure 1 here >

Qualitative responses: Groups vs. Relationships.[8] Before we designed Study 2, we undertook a thematic analysis – a qualitative method used for 'identifying, analyzing and reporting patterns (themes) within data' (Braun & Clarke, 2006) – of Study 1 participants'

responses to the instruction 'please describe why your group/ relationship is important or unimportant to you' to investigate whether (a) there is indeed some overlap in what participants wrote about in the groups condition, compared to the relationships condition; and (b) whether the groups manipulation did indeed invoke identities and psychological needs (that matched our theoretical predictions and quantitative results) in a way that the relationships manipulation did not. An independent researcher trained in thematic analyses and blind to the conditions and purpose of the study was provided with a random sample of 20 participant responses (the independent researcher was given participants' *descriptions* of their groups or relationships, but they were not told what type of social tie participants were reflecting on (groups or relationships)). The researcher then devised a coding framework by coding participants' responses and grouping these codes into themes. We then used this coding framework to analyze participants' responses. The following is structured in terms of the main themes which emerged from the responses.

We gained insight into the additional functions that groups provide (in comparison to relationships). Our qualitative analysis of participants' responses revealed an important distinction between the functions of groups and relationships: like relationships, groups allow people to interact with one another (46% of participant responses in the groups condition, and 50% of participant responses in the relationships condition made references to interactions), but, additionally, groups also provide people with a clearly defined *identity* (38% of participants in the groups condition vs. 3% of those in the relationships condition made references to their social identity). Here are two examples:

> *I love being an Indian. It is who I am. I am proud to be a part of it. I love variety in my life and being an Indian allows me to enjoy different cultures. I love being with other Indians.*

> *Besides my family, my health and fitness are the most important aspect of my life. My job as a trainer has become a part of who I am for 20 years.*

These suggest that social groups are valued by participants because they provide them with a self-definition that helps them to understand themselves and their social world, and that this satisfies psychological needs and enhances well-being. In fact, we found that both relationships and groups seemed to offer feelings of support and relatedness, but that groups additionally satisfy self-esteem and competence needs. Participants writing about their groups, like those writing about their relationships, wrote about the feelings of support (mentioned by 65% of participants in the groups condition and 60% of participants in the relationships condition) and relatedness (mentioned by 54% of participants in the groups condition and 43% of participants in the relationships condition) they receive from their group members. For example, one participant explained that his flatmates are very supportive: 'Essentially my family away from my family. They are so supportive and there for me and by my side in anything I want to do'. Another participant described how his nationality offers feelings of relatedness: 'it's important to me to feel at home in this country by meeting and spending time with others who share the same nationality – we have a lot in common and share the same lifestyles.' The group identity here (that of nationality) appears to lay the foundation for friendships with those who share the identity (Hogg & Hains, 1996), so connectedness does not appear to be derived solely from interpersonal intimacy.

However, in contrast to relationships, groups also provided people with a sense of self-esteem (mentioned by 25% of participants in the groups condition vs. 2% in the relationships condition) and competence (mentioned by 31% of participants in the groups condition vs. 0% in the relationships condition). For example, one participant described his

'PhD group' as 'important from a professional and motivational point of view and for [his] self-confidence'; and another participant wrote that his sports team 'motivates [him] to perform well for the team, it makes [him] feel like a better player.'

Our qualitative analysis therefore suggests that there is some overlap in what participants wrote about in the groups condition, in comparison to the relationships condition, but, nevertheless, there is clear evidence that the group manipulation did invoke identities and additional psychological needs in a way that the relationships manipulation did not. In the next two studies, then, we sought to provide quantitative evidence for the idea that priming social groups leads to stronger effects than priming relationships due to the social identities that are unlocked, and that this satisfies psychological needs and enhances well-being.

Studies 2 and 3

In the next two studies we built on Study 1 by investigating the mechanisms through which groups can enhance well-being. To do this, we primed different types (Study 2) and features (Study 3) of groups and observed which led to the greatest increases in well-being, in an attempt to disentangle identity effects from other collateral effects of groups and relationships.

It is important to note, however, that, while differentiating between different types of groups is a useful research methodology to disentangle the dual functions of groups – the provision of a social identity as well as a base for interactions - in reality both functions are dynamic, mutually reinforcing, and present in virtually all groups (Deaux and Martin, 2000; Easterbrook and Vignoles 2012; 2013; Prentice and colleagues 1994; Postmes et al., 2005; Reicher, 2001). The dichotomy between social categories and interpersonal networks therefore should not be reified. In Studies 2 and 3, then, we asked participants to reflect on

either social categories or social network groups merely as a useful way of empirically distinguishing different group functions, rather than an endorsement of any particular typology of groups.

We conducted studies 2 and 3 online, which allowed us to collect a more heterogeneous sample than the student participants in study 1. Partly for this reason, we also removed the initial mood induction (impractical and unethical to implement online) and focused on a different and more general well-being outcome — life satisfaction, another form that the construct of well-being encompasses (Diener, 1984), and a measure that has been used in previous social cure work (Greenaway et al., 2016) — thus testing the generalizability and effectiveness of group priming manipulations beyond their ability to raise artificially dampened mood.[9]

We hypothesized that:

(H3) Thinking about groups that have more clear-cut identities will have positive effects on life satisfaction in comparison to thinking about groups that are more focused on interactions.

(H4) The satisfaction of psychological needs of connectedness and self-worth will mediate the beneficial effect of group identities on life satisfaction.

Study 2

We report all measures, manipulations, and exclusions in this study.

Method

Participants and design. An online survey was advertised on social media (Facebook and Twitter) and completed by 401 participants. Of these, 84 participants dropped

out at very early stages of the survey and were therefore excluded from the study. Our final sample size was 317 (185 female; Age: M=26.72, SD=9.05, Range = 16-77 years).[10] Compensation was not offered to participants. Participants were randomly assigned to one of the three conditions (social categories vs. social networks vs. relationships). All participants then completed measures of psychological need satisfaction (relating to their groups or relationships) and well-being.

Materials and measures

Conditions. In the Social categories condition (n= 103)/ Social networks condition (n = 110)/ Relationships condition (n = 104), participants were provided with a brief definition of a social category/ social network/ relationship and were asked to list three of their social categories/ social networks/ relationships. These definitions were respectively: "Social categories can be very large and inclusive such as nationality, gender, or age, or more exclusive, such as Sussex University students. You do not have to know all the members of the category, you only need to consider yourself a member of that category" (nationality (26%) was the most frequent social category listed, followed by profession (21%) and gender (19%)); "Social networks can be anything from formal organisations such as your group of work colleagues, to informal groups such as your family, friends, and flatmates, but you should know all or most of the members of the group personally" (family (34%) was the most frequent social network listed, followed by group of friends (30%) and group of colleagues (17%)); "An interpersonal relationship is a strong, deep, or close association or acquaintance between two people that may range in duration from brief, such as a teacher or flat mate, to enduring, such as a romantic partner or relative" (relative (36%) was the most frequent relationship listed, followed by romantic partner (23%) and friend (22%)).

Psychological need satisfaction. Participants then completed measures of psychological need satisfaction relating to each of their three social categories, social

networks, or relationships (same needs as in Study 1). Participants' listed social categories, social networks, or relationships were re-displayed on these subsequent pages, so that they could be seen whilst being rated. All items used a 5-item scale from 1 *Strongly Disagree* to 5 *Strongly Agree* that consisted of a single item for each need. These measured: social support ('This group/ relationship makes me feel like I have the support I need from other people'; α = .71; adapted from items used in Haslam, Reicher & Levine, 2012), self-esteem ('This group/ relationship gives me high self-esteem'; α = .76; single-item self-esteem scale; Robins et al., 2001), competence ('This group/ relationship makes me feel that I am good at what I do'; α = .78; adapted from Basic Psychological Needs Scale (BPNS); Deci & Ryan, 2000), and relatedness ('This group/ relationship makes me feel close and connected to the people that are important to me'; α = .72; adapted from Basic Psychological Needs Scale (BPNS); Deci & Ryan, 2000). We computed the mean rating for each of the needs by averaging the three items assessing that need (one for each relationship/group).

Well-being. Life satisfaction served as our measure of well-being. Life satisfaction was measured using the Satisfaction with Life Scale (SWLS; Diener et al., 1985) and the mean SWLS score of all items served as out measure of life satisfaction (α = .93).

Results

Types of groups: social categories vs. social networks. The following contrasts were computed: 'Social categories & Networks (groups) vs. Relationships' (contrast-coded: categories (1), networks (1), relationships (-2)), and 'Social categories vs. Social networks' (contrast-coded: categories (1), networks (-1), relationships (0)) which, when included in the same regression model (R^2 = .19, $F(2, 314) = 37.73$, $p < .001$), both significantly predicted life satisfaction ('Social categories & Networks (groups) vs. Relationships': β= .43, p < .001, CIs [.37, .59], Cohen's *d* = .97; 'Social categories vs. Social networks': β= .10, p = .04,

CIs[.01, .38], Cohen's *d* = .30). In other words, priming social categories (*M* = 5.32, *SD* = 1.44) and social networks (*M* = 4.93, *SD* = 1.08) caused participants to report higher life satisfaction than priming relationships (*M* = 3.70, *SD* = 1.65), and, critically, priming social categories caused participants to report better life satisfaction than priming social networks. We are confident that participants were responding to the conditions correctly because we checked that those in the social categories, social networks, and relationships conditions listed social categories (97%), social networks (95%), and relationships (97%), respectively.

Mediators of the social categories vs. social networks effect. We created the same two composite need measures as in Study 1: Self-Worth (α = .91) and Connectedness (α = .90). Tests for evidence of mediation were conducted using PROCESS (2012) model 4 (95%CIs; 5000 bootstrap samples). We specified a multiple mediation model with the two needs mediating the effect of the 'Social categories vs. Social Networks' contrast on life satisfaction, with 'Social categories & Networks (groups) vs. Relationships' as a covariate (see Figure 2).[11] This model (R^2 = .47, $F(4, 312) = 73.07$, $p < .001$) showed that connectedness and self-worth were underlying the effects of the critical 'Social categories vs. Social Networks' comparison. Once these needs were included in the model, 'Social categories vs. Social Networks' *only indirectly* predicted life satisfaction via connectedness (indirect = .07, CIs [.02, .16]) and via self-worth (indirect =.06, CIs [.01, .14]). The direct effect of 'Social categories vs. Social Networks' on life satisfaction was not significant (direct = .07, CIs [-.08, .23]). Thus, participants who thought about groups that have stronger identities reported a more positive outlook on life than participants who thought about groups that are more focused on interactions, and this was due to increased feelings of connectedness and self-worth.

< Figure 2 here >

Study 3

Study 2 showed that participants who wrote about groups reported a more positive evaluation of their life than participants who wrote about interpersonal relationships. Critically, however, supporting H3, participants who wrote about social categories reported a more positive evaluation of their life than participants who wrote about social networks. The greater beneficial effect of social categories was due to the greater feelings of connectedness (social support and relatedness) and self-worth (self-esteem and competence) they provided (supporting H4). These results suggest that the clear collective identities that groups provide may be driving the findings from our first two studies: that groups are beneficial for well-being because these identities more strongly satisfy the psychological needs for self-worth and connectedness.

In study 2, we used social categories versus social networks to distinguish empirically the group functions of providing clear identities and a base for interactions. In study 3, we determined whether it is indeed these group *identities* that are responsible for the beneficial effects on well-being by taking a more focused approach to assessing these two group functions. Firstly, we asked participants to think of groups that either offer them clear identities or that support their interactions, thus directly priming these rather than using group type (categories and networks) as proxies. Second, because we found that groups were consistently more beneficial than relationships, we decided to focus only on the dual functions of groups and hence dropped relationships from the design. However, in Study 3 we directly address whether group memberships are only beneficial because they facilitate interpersonal relationships amongst members by asking participants to think about their social interactions *within* their particular group memberships. We report all measures, manipulations, and exclusions in this study.

Method

Participants and design. An online survey was administered and completed by 242 participants, who were recruited through social media (Facebook and Twitter) advertisements online. Of these, 59 participants dropped out at very early stages of the survey and were therefore excluded from the study. Our final sample was 183 (111 female; Age: M=27.51, SD=12.58, Range = 15-78 years).[12] Compensation was not offered to participants. Participants were randomly assigned to one of the two conditions (group identity vs. group interaction). All participants then completed measures of psychological need satisfaction and well-being.

Materials and measures

Conditions. In both conditions, participants were provided with a brief definition of a social group: "People belong to many different social groups, ranging from small friendship groups, flatmates, or work colleagues, to larger and more inclusive categories of people such as British, female, University of Sussex student, Muslim, footballer, or psychologist." They were then asked to write down three groups that they belonged to and were important to them. Participants in the Group identity condition (n = 90) were provided with the following instructions: "Now, please spend some time thinking about how these group memberships affect your sense of who you are, or your identity. Please try to describe in a few sentences how these group memberships affect your sense of who you are." (profession (34%) was the most frequent group listed, followed by nationality (24%) and religion (9%)); whereas participants in the Group interaction condition (n= 93) were provided with the following instructions: "Now, please spend some time thinking about what it is like when you interact with other members of these groups. Please write down a few sentences about what it's like to interact with other people who are members of these groups." (group of colleagues (21%) was the most frequent group listed, followed by group of friends (19%) and family (18%)).

Psychological need satisfaction. Participants then completed measures of psychological need satisfaction (same needs as in Studies 2 and 3). All measures used a 5-item scale from 1 *Strongly Disagree* to 5 *Strongly Agree,* and were made up of the same items used in Study 1. These included items measuring social support (α = .96), self-esteem (α = .96), relatedness (α = .94), and competence (α = .97).

Well-being. As in Study 2, life satisfaction was measured using the SWLS (α = .97).

Type of group. At the end of the survey participants were asked to indicate whether the groups they listed at the beginning of the survey were a Social Category or a Social Network. This was in order to be able to determine whether participants primarily drew on their social category memberships when asked to consider their group memberships that provide them with clear identities, and on their network groups when asked to consider their group memberships that afford them interpersonal interactions.

Results

In line with our hypothesis, our manipulation primed participants to choose specific kinds of groups - social categories when asked to think about the identities groups provide them with (67% of participants in the group identity condition focused on social categories), and social networks when asked to think about what it's like to interact with fellow group members (79% of participants in the group interaction condition focused on social networks).

There was a significant association between Condition and Type of group (categories vs. networks) for each of the three groups that participants listed: $\chi(1) = 60.46$, $p < .001$ (group 1); $\chi(1) = 32.67$, $p < .001$ (group 2); $\chi(1) = 31.06$, $p < .001$ (group 3). Participants primarily drew on their social category memberships when asked to consider their group memberships that provide them with clear identities, and on their network groups when asked to consider their group memberships that afford them interpersonal interactions.

Functions of groups: group identity vs. group interaction. An independent groups t-test showed that life satisfaction differed by condition $t(181) = 7.98$, $p < .001$. The mean life satisfaction score for those in the group identity condition (M = 5.90, SD = 1.27) was higher than for those in the group interaction condition (M = 4.16, SD = 1.64) ($M_{diff} = 1.74$, CIs [1.31, 2.17], Cohen's $d = 1.18$).

Mediators of the category group identity vs. network group interaction effect. We created the two composite needs measures of Connectedness (α = .96) and Self-worth (α = .97). Tests for evidence of mediation were conducted using PROCESS (2012) model 4 (95%CIs; 5000 bootstrap samples). Condition was coded as Category group identity (2) and Network group interaction (1). This model ($R^2 = .65$, $F(3, 179) = 110.23$, $p < .001$) showed that there was a significant *indirect* effect of Condition on life satisfaction via connectedness (indirect = .36, CIs [.041, .631]) and via self-worth (indirect = 1.21, CIs [.870, 1.64]); but the direct effect of Condition on life satisfaction was not significant (direct = .17, CIs [-.190, .528]). (see Figure 3).

< Figure 3 here >

General discussion

Across three studies, we report the first *experimental* evidence demonstrating that reflecting on one's important group memberships satisfies the psychological needs of connectedness and self-worth to a greater extent than reflecting on one's important relationships, and thus better restores (study 1) and enhances (studies 2 and 3) well-being. Crucially, we also demonstrated that the additional benefit to well-being associated with groups was driven by the collective identities they provide (studies 2 and 3).

The critical advance that the present experimental research provides, then, is that it substantiates existing correlational research that has shown that group ties have an especially important role to play in protecting well-being compared to individual ties (e.g. C. Haslam et al., 2014a; C. Haslam et al., 2016). In doing so, the present research overcomes the limitations that affect the strength of conclusions that can be drawn on the basis of these existing correlational designs alone; such that we can now be more confident about causality – that is, that thinking about belonging to groups, relative to thinking about relationships, leads to increased well-being. Furthermore, and following this first point, no previous experimental work exists to support the proposition that group memberships influence well-being, more than relationships, by offering members greater levels of social support (C. Haslam et al., 2014a) and satisfying the psychological needs of relatedness, competence and self-esteem. Our studies are the first to *experimentally* demonstrate that group ties are more beneficial than individual ties due to greater levels of social support *and* more general social connectedness (including feelings of relatedness) as well as feelings of self-worth (competence and self-esteem) – thus providing an examination of the proposed mechanisms that underpin the association between group ties, relative to individual ties, and well-being, and developing the knowledge base about *how* group memberships influence well-being. This latter finding complements and extends previous work on the psychological resources that groups provide (e.g., Greenaway et al., 2016; also see C. Haslam et al., 2018), and integrates three theoretical frameworks – Social Identity Theory, Self-Determination Theory, and the Social Cure – to provide a novel explanation, and process underlying social identities, of the potential additional well-being that groups, relative to relationships, can provide.

We also provided experimental evidence suggesting multiple group memberships may protect well-being to a somewhat greater extent than interpersonal relationships (experiment 1) because they provide strong identities (experiments 2 and 3). This latter finding

demonstrates that, over and above providing more opportunities for building important relationships, groups provide something additional - clear social identities. Taken together, the studies that we report can be regarded as a series of replication studies around a common theme. Our data suggests that it is the focus on the self and on a higher order construal, that are integral to the concept of social identification, which could well be the mechanism through which our manipulations work. In this paper, we have argued that shared group memberships impact on people's psychology through their capacity to be psychologically internalized as part of the *self*. In this regard, the key difference between group and interpersonal ties or interactions is that the former promote, and are internalized as part of, a person's social identity, whilst the latter are not (or are so to a lesser degree). Theoretically, then, as we argued in the introduction of the paper, a group identity is a higher-order construal with a focus on abstract goals and values. In this way, groups/ categories/ social identities are more abstract than relationships/ networks/ interactions; and so, this self-focus abstract-construal interpretation could very well help to explain the critical groups vs. relationships (Study 1), categories vs. networks (Study 2), and identities vs. interactions (Study 3) comparisons.

When our social groups become part of the self in this way, we become more able to influence group members and be influenced by group members. That is, we are more able to provide, and accept, support, and more able to boost others' and our own feelings of relatedness, competence, and self-esteem; that come about via defining ourselves in this way, and interacting with fellow group members. Social identification, then, make the psychological resources that stem from group ties all the more powerful because in positively influencing a fellow group member (e.g. another member of the University of X), we are also shaping ourselves ('us'). Theoretically, then, as C. Haslam and colleagues (2016) explain,

the magnitude of psychological impact that we experience from our individual ties may not surmount to this, because the way we connect with others in terms of a shared social identity (e.g. as members of the University of Sussex) does not equate to the way one individual (e.g. Arabella) connects to another individual (e.g. Matt) in terms of two separate personal identities.

It is known that social connection improves health, well-being and longevity (Holt-Lunstad et al., 2010). Hitherto, key advice given by social theorists has been for people to foster, nurture and build social connections with other people (Seppala, 2012). But knowing that group ties are generally more successful at protecting and promoting well-being provides us with important additional material for an intervention. In particular, it suggests that we should work on helping people to develop their relationships with *groups of others*. Importantly, our findings – and others' (e.g. body of work presented in C. Haslam et al, 2018) - imply that simply advising people to join more groups is not enough. To prove beneficial, people have to identify with, and internalize, those group memberships. The present research suggests that this has distinctive benefits for well-being because, as a source of social identification, groups are an especially powerful basis for social connectedness and self-worth.

We acknowledge two limitations of the research presented here. First, we recognize the methodological difficulty inherent in experimentally disentangling the effects of groups from relationships. There may have been some overlap between the Groups and Relationships conditions in Study 1, but we addressed this issue in Studies 2 and 3. Second, Study 1 relied on a homogenous sample of students which might compromise generalizability. However, this disadvantage was outweighed by the tighter experimental control and greater participant engagement that individual participant testing afforded. We also acknowledge that there are

arguably a number of other psychological needs that could be investigated as mediators of the especially beneficial role of groups, compared to relationships; and future research should address this limitation. Future research should also directly investigate our novel construal hypothesis – that the higher-level abstract construal associated with social identification may be the mechanism that underlies the curative properties of groups, compared to interpersonal relationships.

Despite these limitations, our work provides rare experimental evidence that suggests that thinking about group memberships can restore and enhance well-being to a greater extent than thinking about relationships, and that it does so because groups satisfy psychological needs through the collective identities they provide. Activating social identities offered people a sense of connectedness and self-worth, which constitutes a 'social cure', alleviating unhappy feelings and promoting a positive outlook on life. Our findings thus strengthen the Social Cure argument that people become stronger, more resilient, and feel better, because of the psychological resources offered by social identities, and that this is because they make them feel more connected and that they have greater self-worth.

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Table 1. *Hierarchical Multiple Regression Predicting post-positive affect from 'Social vs. Control' and 'Groups vs. Relationships': Study 1*

	Overall-affect Post-Manipulation	
	Model 1	Model 2

Variable	B	*Std. Error*	β	95% CI (B)	B	*Std. Error*	β	95% CI (B)
Constant	3.36***	.26		[2.84, 3.88]	3.52***	.19		[3.15, 3.88]
Pre-affect	.14	.11	.11	[-.09, .36]	.06	.08	.05	[-.09, .22]
Social vs. Control					.41	.04	.68***	[.33, .48]
Groups vs. Rels					.24	.07	.24***	[.11, .37]
R^2	.01				.53			
F	1.46				42.89***			
ΔR^2	.01				.51***			
ΔF	1.46				62.85***			

Note. $N = 120$. ***$p < .001$

Table 2. *Pearson correlations between means of each mediator*

	Self-esteem	Relatedness	Competence
Support	.69**	**.81****	.67**
Self-esteem		.69**	**.87****
Relatedness			.69**

Note. Bold correlations indicate relationships between needs that were combined into composite measures. ** p <.01.

Figure 1. Regression coefficients for the relationship between 'Groups vs. Relationships' and positive affect post manipulation as mediated by connectedness and self-worth, controlling for 'Social vs. Control' and positive affect pre-manipulation.
*$p < .05$; ***p < .001

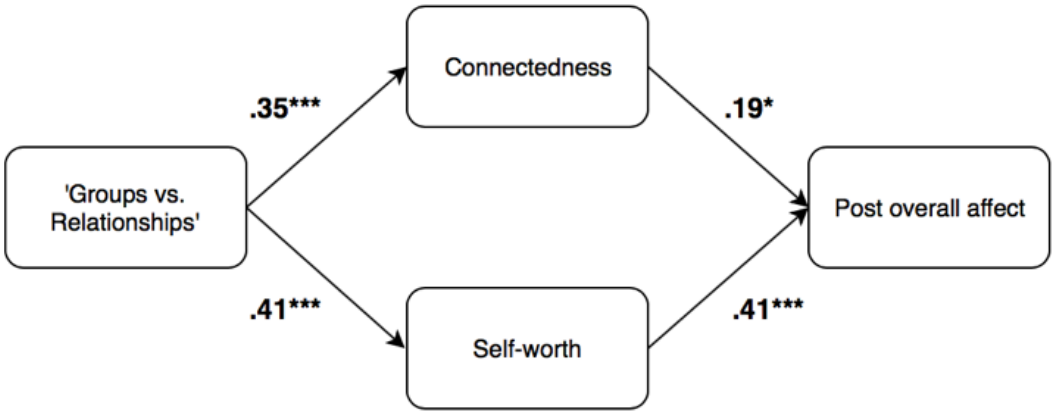


Figure 2. Regression coefficients for the relationship between 'Social categories vs. Social networks' and life satisfaction as mediated by connectedness and self-worth, controlling for 'Social categories & Networks (groups) vs. Relationships'.
*p < .05; **p < .01.

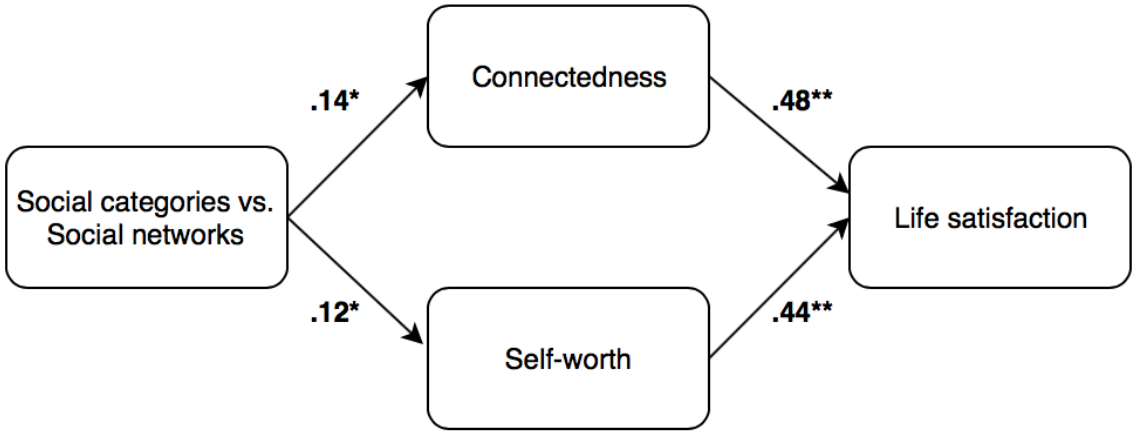
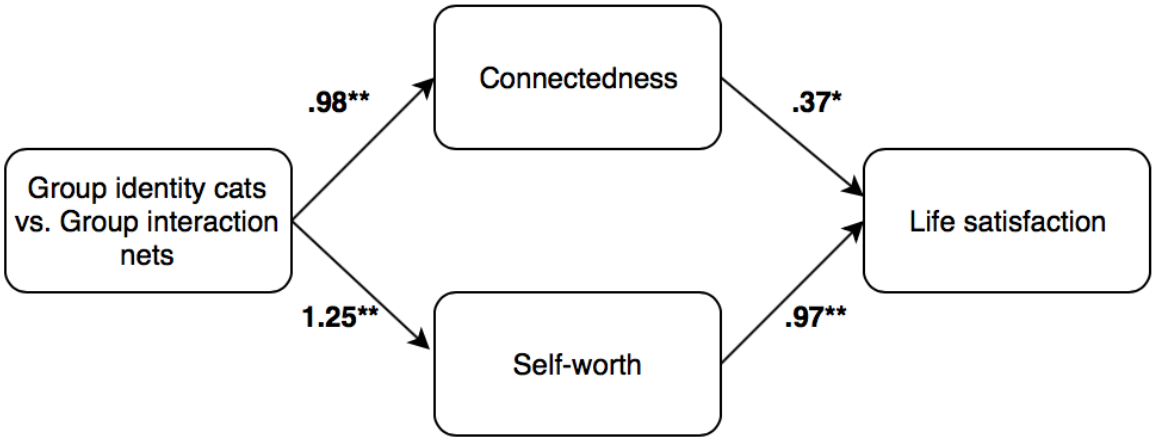


Figure 3. Regression coefficients for the relationship between condition and life satisfaction as mediated by connectedness and self-worth.
*p < .05; **p < .001.



Content footnotes

[1] We also included two additional measures of psychological needs in studies 1-3. In Studies 1, 2 and 3 control and autonomy were also included as potential mediators of the Social Cure effect. However, due to concerns about power and corrections for multiple testing, we did not include these needs in our analyses. Nevertheless, because control and autonomy have been found to mediate the social cure effect in previous research (control: Greenaway et al., 2015, 2016; autonomy: Koudenburg, Jetten & Dingle, 2017) we include analyses including control and autonomy in the supplementary materials (see '(7) Mediation models including Control and Autonomy as potential mediators: Studies 1, 2 & 3)'. These results indicate indirect effects via connectedness and self-worth (but not control or autonomy) across all three studies, which supports our focus on them in the manuscript.

[2]See supplementary materials '(1) Participant booklets (pilot study and S1)/ Full surveys (S2 and S3)' for the full booklets given to participants for all studies.

[3] In Study 1, no differences emerged when we conducted our analysis using the positive and negative affect subscales separately. We therefore analyze PANAS as a single (positive valence) scale.

[4] See supplementary materials '(2) Pre-testing experimental manipulation: results of two pilot studies' for results of our two pilot studies that confirmed the effectiveness of our experimental manipulation.

[5] A thematic analysis of participants' responses to the pilot study instruction 'please describe why your group/ relationship is important or unimportant to you' revealed these needs that also matched our theoretical predictions. See supplementary materials '(3) Thematic Analyses (pilot study & study 1)'.

[6] See supplementary materials '(8) Descriptive statistics and correlations between variables: Studies 1, 2 & 3' for descriptive statistics and correlations among variables within each study.

[7] We find the same factors in both the subsequent studies and therefore create the same composite needs in all subsequent studies. See supplementary materials '(6) EFA: studies 2 & 3' for the EFA relating to Studies 2 and 3.

[8]See supplementary materials '(3) Thematic Analyses (pilot study & study 1)' for more examples of each theme.

[9] In both Study 2 and Study 3 the same main effect was obtained when using PANAS as our well-being measure, however, in Study 3, self-worth was found to be the only significant mediator of this main effect (see supplementary materials '(5) Well-being operationalized as mood in Studies 2 and 3').

[10] Power analysis (using G*Power) indicated that 52 participants per condition would be required to detect an effect similar to that which we found, with 80% power and $\alpha = .05$.

[11] See supplementary materials '(4) Study 2: mediators of the social categories & networks (groups) vs. relationships effect' for results of a multiple mediation model with the two needs mediating the effect of the 'Social categories & Networks (groups) vs. Relationships' contrast on life satisfaction, with 'Social categories vs. Social Networks' as a covariate.

[12] Power analysis (using G*Power) indicated that 20 participants per condition would be required to detect an effect similar to that which we found, with 80% power and $\alpha = .05$.